

June 8, 1929

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AVIATION

The Oldest American Aeronautical Magazine



SPECIAL FEATURES

SELLING *Passenger* AIR TRANSPORTATION

Operation OF THE SCHENECTADY AIRPORT

THE *Cross License Agreement* AS IT STANDS TODAY

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Represented in Canada by the Canadian Motor Vehicle Distributors

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AIRCRAFT ENGINE
and the
ARGO
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AVIATION, as an industry, will naturally develop along lines similar to other modern industries. Through the experimental and the spectacular, it has already reached the manufacturing stage. A new giant industry is in sight. Soon will come standardized, mass production. And then will appear the old, familiar problems of economical manufacturing and efficient distribution.

To such problems the master key is Location. Geographical Location can actively work for or against a business. Since the Industry of Aviation is so new, it starts without handicaps. It is easy for a manufacturer in this line—today—to stretch himself behind the solid advantage of strategic location. It is better to establish oneself now, with an eye toward the future, than to wait until business roots have sunk deeply into an unfavorable location.

Where Aviation Advantages are Concentrated

Strategic Industrial Location so places a factory that natural conditions, raw materials, power, labor, transportation, markets and other co-acting factors combine to serve it most efficiently. Obviously, if your business is concerned with Aviation, it ought to be located where the most Aviation exists. Examination of the facts points to the Central States as the natural headquarters of American Aviation, because this section best meets its requirements. Here, for this reason, practically half of this country's Aviation activities of every kind are concentrated.

St. Louis is the central manufacturing city of all this clearly air-minded region. Within a 500-mile sweep—five hours by air—is a 50,000,000 population. In this comparatively level country, free from mountain ranges or large bodies of water, are nearly half the present airplane manufacturers, licensed pilots, registered mechanics, and existing planes in all the United States. Here the business of Aviation, because of the advantages present, is developing most rapidly and most successfully.

As the focal business center of this territory, St. Louis offers opportunity. The divided facts are worth knowing and considering. A Special Aviation Survey, clearly and accurately assembled, will be furnished at the request of manufacturers, bankers, or business men.

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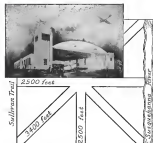
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ing from these distances:

50 to 75 miles \$ 25
75 to 100 " 50
100 to 125 " 75
125 to 150 " 100
150 to 175 "	..... 125
175 to 200 "	..... 150
200 to 225 "	..... 175
225 to 250 "	..... 200
250 to 275 "	..... 225
275 to 300 "	..... 250
300 to 325 "	..... 275
325 to 350 " 300
350 to 375 " 325
375 to 400 " 350
400 to 425 " 375
425 to 450 " 400
450 to 475 " 425
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675 to 700 " 650
700 to 725 " 675
725 to 750 " 700
750 to 775 " 725
775 to 800 " 750
800 to 825 " 775
825 to 850 "	..... 800
850 to 875 "	..... 825
875 to 900 "	..... 850
900 to 925 "	..... 875
925 to 950 "	..... 900
950 to 975 "	..... 925
975 to 1000 "	..... 950

Comments must land on field
after 11 A.M. How plane is
operated at operation manager's
office after arrival from other
ports will be adjudged winners.

2nd Day, Sun. June 23

Fries to Visiting Flyers fly-
ing from these distances:

50 to 75 miles \$ 25
75 to 100 " 50
100 to 125 " 75
125 to 150 " 100
150 to 175 " 125
175 to 200 " 150
200 to 225 " 175
225 to 250 " 200
250 to 275 " 225
275 to 300 " 250
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DEPARTMENT OF COMMERCE APPROVAL 1B1



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Side Slips 2006

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5. If not when have been your difficulties?
6. Have you any suggestions to offer?
Do not let greater rules and larger production interfere with the high standards which you have set to the world. It is far better to build a lot of good airplanes than a few bad ones. Keep Progressing as you have done in the past.
7. Have you always received satisfactory service and shipment on parts?
Shipment has always been promptly and efficiently handled.
8. In general how are you satisfied with Travel Air Products and would you buy another Travel Air? If we had a model that would meet your requirements?
Absolutely sold on Travel Airs. Would like very much one of the new four place airplane (No. 1 P. 5 - RV) Emory knows all about this.
9. May we quote you in our advertisement?
Yes, as long as no particular mention is made of my name. Tell about the No. 4 which is still going strong with original motor No. 4418 (C-3) of which RV Emory put on over 300 hours and took third place in the 1927 Transcontinental Air Derby.

T. F. Murphy,
Box 181, Cedar City, Penn.

1. When did you purchase your Travel Air Plane?
I bought my Travel Air on May 20, 1926.
2. What is the Serial Number on your plane?
Number 492.
3. Have you always been satisfied with it?
I have been very much so. I think they are the best ships built.
4. If so, will you please name the features that appeal to you most forcibly in this plane?
The Travel Air is very easily handled and makes the most ideal ship for navigation. Enhanced rugged and efficient and handling features are most essential.
5. If not, what have been your difficulties?
I have never had any difficulties with my ship in any way and furthermore I think they are best ships on the market today.
6. Have you any suggestions to offer?
Build more Travel Airs for the air.
7. Have you always received satisfactory service and shipment on parts?
I never need worry about repairs on a Travel Air, as you don't need money and they are sure not to fly and are to rebuild. I received 14 days service last July on one new wheel and a landing gear.
8. In general how are you satisfied with Travel Air Products and would you buy another Travel Air? If we had a model that would suit your requirements?
I am what critics would call a Travel Air fan. If anybody builds a better ship than Travel Air I mean to fly it. They will have to show me. I have never been here to fly anything but Travel Airs, and furthermore I will buy tonight but Travel Airs as long as they are built.
9. May we quote you in our advertisement?
Yes, and if I can be of any more service to you just let me know.

Herbert D. DeVore,
Wood River, Nebraska

Securely Travel Air send a questionnaire to all Travel Air owners, now numbering over 1000. The above are two of the replies. Others will be published next week in this magazine.

Free on request "The Story of Travel Air," new edition

"The Standard of Aircraft Comparison"

TRAVEL AIR COMPANY

WICHITA, KANSAS



THE OLDEST AMERICAN AERONAUTICAL MAGAZINE

June 8, 1929

Price 10c 10c



And Then What?

WE RECEIVED WORD the other day from the Department of Commerce in Washington that the editorial phase had had a crack up. This unfortunately was not news. We knew all about it, and it happened a month before the letter was received. The letter further suggested that if we wished to fly the plane far here or abroad, we get in touch with the Government inspectors at the field where the plane is now stored. This field is some four hundred miles from where the crack up occurred, and as we are asked to communicate with the inspector just as soon as we know definitely when the repairs are completed, we are wondering how we are supposed to have traversed the intervening distance, and what we are supposed to have been doing during the intervening month.

Really the letter in print face evidence that the regulations are not functioning as they are supposed to function. Blame is rightfully put on lack of appropriations and the tremendous growth in the number of planes and pilots being licensed. Will this situation remedy itself? Is not the growth in the number of planes continuously going to keep ahead of Government inspectors who receive their instructions from Washington? Is not our whole system of aircraft regulation based on the experience of a time when there were only a few thousand airplanes?



Field Regulations

IF EVERY PILOT were an expert the present lobby about enforcing flying regulations would not be so loud. But so it is the conditions at most flying fields are such as to almost invite disaster. When there is a wind planes will land and take off into it but after they have landed or taken off there is no telling as to whether they will turn to the right or the left. Students practicing landings will stop in the middle of the field and discuss matters with their instructor and then turn off into the path of a plane about to land.

Such conditions exist at the majority of commercial fields and are tolerated not because they are necessary or unavoidable but because no one bothers to see that the field flying regulations are enforced. Most fields have rules which would avoid the greater part of the confusion which now exists. Absolute inflexibility of enforcement might not be practical but certainly on a calm day a direction and area for landing and takeoff could be laid out and if a few students and misreport pilots were grounded for landing in the wrong direction conditions would be rapidly improved. Unless the owners and operators of flying fields see that flying rules are lived up to the results may be disastrous.



Transcontinental Routes

WHEN the air mail was young and traffic was light there was every reason for concentrating on one transcontinental line. Installing the proper ground business was expensive and there was not enough business to warrant the diversion of any business to other routes. With the increase in business and the constant improvement of operating methods it would seem as if the time had come for three transcontinental airlines. One would run through the southern states from Jacksonville to San Diego via New Orleans. A second would run from Washington to St. Louis and then to San Francisco, the third would follow the northern route through from New York to Chicago and to Seattle.

Such a system would, however, naturally cut into the hands of the existing trunk systems and would therefore increase the expenses. If rates are reduced as proposed by Postmaster General Walker Brown it will make it very difficult, if not impossible to enlarge the scope of air mail operations. There is still much expansion and experimentation to be done in air transportation and this seems like a poor time to be cutting down on the rates paid to contractors. The dollars which the Government will save on the air mail contracts could not be better spent than in speeding up transportation.

Operation OF THE SCHENECTADY

By JAMES P. WINES

MANY PERSONS hold that airports should be municipally owned and operated, just as harbor facilities for surface vessels are maintained by the Government. There are any number of arguments to be brought forth in support of this belief, but its real basis probably lies in the fact that few believe an airport can be operated profitably. However, there are privately owned airports that will be profitable business ventures in the future, although they may not be breaking even at the present time. Schenectady Airport is one of them.

The city of Schenectady, N. Y., has no municipal field. In fact, the privately owned Schenectady field is the only one of which the city has boast. The airport at Albany is 7 miles away and the one at Troy is 15 miles distant, but there are no other fields in the immediate vicinity. This may be attributed to the rolling country in that portion of the state, and also to the fact that Schenectady Airport is large enough and is sufficiently well equipped to handle all the commercial aviation needs of the city with its population of 100,000.

There are not yet any passenger air transport lines to or from Schenectady, although it is a stop on the Albany-Cleveland air mail line operated by Colonial Western Airways, Inc. The air traffic of the city is upping and will continue to support one field very nicely, but it is doubtful if two could be operated at a profit. The

truth of this statement is shown by the fact that in the period from Feb. 14, 1927, to Dec. 31, 1928, the first 254 mo. of the existence of Schenectady Airport, Inc., owner and operator of the port, the income from the field more than met the operating expenses and the remainder on the earnings. It did not meet fully the depreciation allowed by the auditors on the buildings and equipment, and there was a deficit of \$1,548.12. However, no operations were conducted at the airport until August 1927, and the field was not formally dedicated until June 1928.

There are now two hangars and an administration building at the Schenectady port. With the increased number of planes, which it is expected will be based there this year, the erection of another hangar is almost certain. In addition, Colonial Western Airways is expected to construct a fourth hangar, and will probably establish a flying school. The granting of a concession for a cocktail lounge hall and restaurant is also contemplated. With the increased revenue from purchases of fuel, rentals, garage, parking and the concessions, it would be possible for Schenectady Airport to show a profit this year. The extensive grading that remains to be done, however, will probably dig deeply into the profits, so that the income will actually be little more than the expenditures.

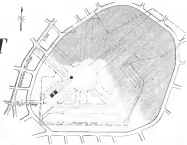
SCHENECTADY AIRPORT, Inc., is a private corporation formed by some of the "armstrong" business men of the city, so that "Schenectady would not be more later on," according to Victor Stancoski, district manager for

AIRPORT

New York Light and Power Gas portfolio and president of the airport company. With the backing of the leaders in the organization, a municipality owned field is all probability could have been arranged for, but being business men they preferred to see the airport a private enterprise. They reasoned that a flying field is similar to a railway terminal and should neither be financed by nor under the control of the city government. They say have seen, also, a profitable return on their investment from a properly managed port. At any rate, Schenectady Airport, Inc., which is capitalized for \$200,000, is the result.

Of the \$100 per share, 7 per cent preferred stock authorized, \$101,250 worth was issued. Common stock with no par, but valued at \$1.425, was also issued. These stocks were offered to the residents of Schenectady, and, as a result, the stockholders in the corporation number about 450. With sufficient money from the sale of the stock to start, the actual work of constructing the airport was begun. A 100-ft. x 6-ft. plane three miles north of the city proper, between the Schenectady-Saratoga highway and the Mohawk River, had been selected and 155 acres of land there were purchased at a cost of \$49,330.87. Of this amount, however, only \$15,730.89 has been paid, since the land is mortgaged for \$33,600.

The shape was irregular, but it was such that it would allow the construction of four long runways, one along the southern boundary of the site from east to west which would measure 2,200 ft. in length; another from northwest to southeast; a third to run from southeast to northwest; and a fourth running north and south. The latter three have each to be 100 ft. wide and 2,500 ft. long and were to intersect at the approximate center of the field. The layout that was planned is shown in the accompanying diagram. The hangars were to be erected to the west of the field in the "V" formed by the intersection of the north-



There is a diagram of Schenectady Airport showing the general area around the airport, the layout of the runway, the position of the airport and other, and the location of the field. The diagram shows the layout of the field, the location of the hangars, and the location of the field. The diagram shows the layout of the field, the location of the hangars, and the location of the field.



Southwest runway and the northeast-southwest runway.

Approximately 52 acres of the land was sufficiently level to be used without a great deal of work, and it is in this area that the operations have been conducted thus far. The most important runs constructed and the intersecting runways were laid out and completed as far as the landing circle in the center. The two hangars and the office building were placed in position in the "V." One thousand dollars was spent last year also for grass seed and fertilizer, water it was intended that every portion of the field, except for the runways, was to be grass covered. In the last few months, however, the plans for the airport have undergone considerable change, and the changes that are contemplated will be significant.

IN THE NEXT PLACE it has been decided that there will be no runways at all on the airport. This decision was made in anticipation of the provision of public opinion regarding away from the runway idea and back to that of fields where landings and take-offs may be made anywhere. Officials of the airport before the construction will take place with the increasing volume of air traffic. As a result, the portions of the runways that were constructed have been obliterated. The entire area will be used for landing and taking off, although there it may be that one-half of it will be used for landing and the other half for taking off.

Instead of maintaining its irregular shape, it is probable that additional land will be purchased to make the field roughly elliptical in form, as shown in the diagram.



A view of the two hangars at Schenectady Airport. The one in the foreground is the main hangar, and the one in the background is the smaller hangar. The diagram shows the layout of the field, the location of the hangars, and the location of the field.

While this has not been definitely decided upon the grading of the 155 acres of moose ground now covering the remainder of the airport property is not as the working level of the 52-acre portion that is in use which was started this year, is being done with a view to providing an 8-ft. crown in the center of the enlarged field. The grading starts also around the fact that a roadway will eventually be built at the way around the field.

The grading of the present acreage of course would have been done even though the plan for the port had not been changed. With the purchase of more land through additional grading will be necessary to prepare it for use as a part of the airport. In the grading, the airport company has been fortunate since the leveling of the moose is providing enough material for filling the depression without importing it. To smooth out the land area owned by the port, it is estimated that 40,000 cu yd of soil will have to be moved. This is being done at an average cost of 15¢ per cu yd according to the contractor.

The soil of the plains when Schenectady Airport is located, is a sandy loam. It is dusty, but not excessively so. Moreover, since the hangars are at the west of the field and the prevailing winds are westerly, the dust is not of serious consequence. The hangars by the way, probably will be moved back to the property line to provide even more room for landing and taking off when the airport is enlarged. That would serve to keep the dust down, of course, but the grass that was sown last year, it was found, was easily torn up by the

tail ends of the planes operating there, and for that reason was not entirely satisfactory. Another argument against the use of soil is the fact that a grass covered field is apt to become soggy in wet weather.

Oil has been considered, but so far no decision has been reached. Officials of the airport say that they are entirely open minded and that in two or three years, when the construction work is entirely completed, some other method for dust abatement may be used if a more satisfactory system has been developed. The foam found at Schenectady allows the surface water to seep through rapidly and is covered off underground by a natural drainage system. As a result, the field is dry, throughout the year. In fact, none of their mail pilots flying over the Albany-Cleveland route this spring are reported to have said that the Schenectady port was the only one on the run where a safe landing could be guaranteed. So it may be better to leave the field as it is than to attempt a doubtful improvement.

When the Schenectady Airport was opened, there were but three planes based there regularly. In the year that has elapsed since the formal opening, this number has increased to twelve. Four of these planes are used commercially, while the remainder are privately owned and are flown by the owners for sport only. Of the four used for commercial work, two are owned by Inter-Cities Flying Service, Inc., which operates a semi-private school, an aerial taxi service and carries passengers on sightseeing flights. It is also a distributor for The Aero Aircraft Company, Troy, Ohio, handling the Waco line in better company, and is a dealer for Stearns Aircraft Corporation, Peoria, Mo., representing that company in ten counties. The two planes owned by the flying service are, a "Whitcomb" powered Stearns cabin monoplane and a Waco "200" Tiger-wing. The third commercial plane is owned by Howard Hurlbut, chief pilot for the Inter-Cities company, who runs his OX-5 powered Waco biplane to the rescue on an hourly basis. The fourth plane is the property of Colmes Plaine, Inc., Colmes, N. Y. and is used for passenger hopping and student work at the Troy Airport.

Only one of the privately owned planes in over a year old. This is a Waco biplane, powered with an OX-5 engine, which was purchased in June 1928. Since that time the two owners have down it about 45 hr. The second privately owned plane to appear at the field was a Vultee powered Monocoupe, purchased in July, 1928. This plane has been flown by its owner approximately 20 hr. A H. Ehrenz, who is connected with the aviation development department of General Motors Company, Schenectady is the owner of the third private plane. He made its appearance at the airport. He purchased a Warner "Scamp" powered Stinson, Jr., in October, 1928, and since that time has flown it about 65 hr.

Three of the other private planes are Wacos, powered with OX-5's. One was purchased in November, 1928,

AVIATION June 8, 1929

AVIATION June 8, 1929

and has been in the air about 35 hr.; another was purchased in February this year and likewise has been flown approximately 38 hr. and the third, which was bought only in April, has had about 25 hr. The remaining two planes are a Standard biplane operated by the Schenectady Flying Club and a privately built but winged monoplane. The Standard which is a reliable plane like the Wacos is powered with an OX-5 engine. It was taken over by the flying club March 1 and has been flown 60 hr. The less winged monoplane is known as a "Northwest Sport Monoplane" and is powered with a Hispano-Suiza engine. It was brought to the field early in April.

THE AIR RANGER SPIES AT Schenectady Airport while recently arrived at as a baby of square feet of wing area and is really based on the type of plane. The monthly fee for the Monocoupe is \$20, for the Waco biplane, \$25; \$40 for the Stinson, Jr., \$35 for the Standard, and \$40 for a plane the size of the Whitcomb powered Stinson. On average average costs \$2 for a small plane such as a Waco and \$3 for the larger types. The charge for outside parking is \$12.50 a month. This has been set at this figure, to discourage the practice.

According to the rules of the airport, all base operations are required to pay a fee of 10 per cent of their gross receipts to the airport company for the privilege of using the field. Other operators, having elsewhere, must also pay 10 per cent of their receipts on weekdays and 20 per cent on Saturdays, Sundays and holidays. While no landing fee is in effect for taxi operation, Colored Western Airways pay at the neighborhood of \$100 a month for the privilege of landing its mail planes on the port every day. Automobile parking is another source of revenue for the airport operating company. A charge of 25¢ for parking at the field is made on Saturdays and Sundays from May to September inclusive. The profit made on the sales of gasoline at the airport, also adds considerably to the income. Sixteen thousand gal-



One end of the White II hangar at Schenectady Airport

lons of fuel were sold in 1928, which is a monthly average of 1,333 gal. This year, the sales are expected to reach 1,800 or 2,000 gal a month.

The airport company receives nothing from the sale of oil or from the servicing concession at the field. These concessions were granted Inter-Cities Flying Service, together with rent for larger space and a reduction of 7 per cent in the fee for the privilege of operating there, in lieu of paying Victor A. Rickard, head of the flying service, a salary as airport manager. This seems to be fair enough arrangement in present, although Mr. Rickard has asked from time to time that he be relieved of his duties as manager so that he may spend more time on his own business. It does not seem probable, though, that another airport manager will appear until the advent of other base operators at the field.

To keep up the plane of the Inter-Cities service a mechanic and a mechanic's helper are kept at the port

FINANCIAL STATEMENT OF AIRPORT COMPANY For December 1928

Assets		
Capital Assets		\$79,512.24
Fixed assets		121.14
Inventory of materials		16,748.00
Total current assets		\$96,381.38
Subtotal in capital stock		
Capital stock		49,000.00
Reserve		329.11
Reserve for depreciation		8,029.11
Total		57,358.22
Reserve for depreciation		75.00
Total		57,433.22
Depreciation		4,000.00
Subtotal in capital stock		53,433.22
Total fixed assets		121.14
Subtotal current assets		95,881.38
Total		\$96,002.52
Liabilities		
Current liabilities		\$1,000.00
Accounts payable		1,000.00
Subtotal current liabilities		\$1,000.00
Total		\$1,000.00
Capital stock		49,000.00
Reserve		329.11
Reserve for depreciation		8,029.11
Total		57,358.22
Reserve for depreciation		75.00
Total		57,433.22
Depreciation		4,000.00
Subtotal in capital stock		53,433.22
Total fixed assets		121.14
Subtotal current assets		95,881.38
Total		\$96,002.52

Fig. 2

COMPARATIVE AIRPORT COMPANY STATEMENT OF PROFIT AND LOSS

Monthly Statement 1928-1929 (December 1928)	
Fixed assets	\$12,141.14
Capital stock	49,000.00
Reserve	329.11
Reserve for depreciation	8,029.11
Total	57,358.22
Reserve for depreciation	75.00
Total	57,433.22
Depreciation	4,000.00
Subtotal in capital stock	53,433.22
Total fixed assets	121.14
Subtotal current assets	95,881.38
Total	\$96,002.52
Liabilities	
Current liabilities	\$1,000.00
Accounts payable	1,000.00
Subtotal current liabilities	\$1,000.00
Total	\$1,000.00
Capital stock	49,000.00
Reserve	329.11
Reserve for depreciation	8,029.11
Total	57,358.22
Reserve for depreciation	75.00
Total	57,433.22
Depreciation	4,000.00
Subtotal in capital stock	53,433.22
Total fixed assets	121.14
Subtotal current assets	95,881.38
Total	\$96,002.52

For 1928-1929 (December 1928) (Table 2)

Fig. 2

and it is these men who service the other planes there. A charge of \$1 an hour is made for servicing the planes regularly based at the field and \$1.50 an hour for transient. The charge for washing and cleaning is but \$1 an hour. The plane owners are not required to have their planes serviced by the mechanics and the mechanic shop which occupies the house at the side of one of the hangars, is open to all who have their planes at the field.

The winging department just about breaks even, Mr. Rickard reports. The profit on oil, which is purchased at 87¢ a gallon and sold at \$1.30 a gallon or 35¢ a quart averages about 35¢ a gallon. Oil sales in 1928 averaged about 20 gal. per month, providing a profit of \$34.50 monthly. In 1928 also, the receipts of Inter-Cities Flying Service amounted to about \$35,000. Since the service pays only 5 per cent for its operating privilege, the profits were \$1,500 greater than would be the case if Mr. Rickard were not the airport manager.

The statement of profit and loss for the airport in the period from Feb. 14, 1927 to the 31st of 1928, and the balance sheet as of Dec. 31, 1928 are shown in Figs. 2 and 3.

It will be seen from these illustrations that Schenectady Airport will soon be in a position not only to pay its own way but to make money for the owners. The ever increasing income should more than pay the operating expenses and also the pay for the improvements in the concession, the removal of all but the restaurant concession on airport activities is important. The payments on the land and the purchase of additional acreage can undoubtedly be financed through the sale of additional stock in the company. The 2 per cent preferred stock will bring a paying cash value in 1932. By that time, the airport should be a paying proposition.

THE Cross License Agreement

AS IT STANDS TODAY

*An Explanation of the Various Functions of
the Manufacturers' Aircraft Association Which has been
Organized to Meet Present-Day Conditions*

By EARL D. OSKORN

IN THE early days of aeronautics patents were issued to the Wright brothers covering certain basic principles which are embodied in practically every airplane of today. Curtiss, Airplane & Motor Company Inc. also obtained basic patents at a later period. There are also certain features that almost every manufacturer of airplane uses on which some other company owns a patent. As a result, commercial aircraft manufacturers could be tied up in a series of law suits which would paralyze the industry.

That this has not already occurred is due simply to the fact that up until the last year or two there have not been enough commercial planes manufactured to make suing worth while. Now that the manufacture of commercial planes is going forward on a large scale, the situation becomes serious. Fortunately, however, this problem has been faced before by other industries, and also by the military manufacturers, and it has been successfully solved.

Before the war, there was a series of law suits on aircraft patents which proved both costly and damaging to real progress. When war seemed imminent, the military airplane manufacturers with the full aid and cooperation of the Government formed an association for the purpose of pooling patents. This association, known as the Manufacturers' Aircraft Association, has functioned ever since July, 1917. At present two of the large military manufacturers belong, but practically none of the purely commercial manufacturers. The two corporations in the military field have coordinated separate arrangements for each patent which they infringe. The maintenance of the Association after the war has resulted in the almost complete elimination of law suits over aeronautical patents.

Under the original scheme which was laid out principally with a new toward settling patent questions is required to high priced military airplanes, the license fee was a flat \$500 for every plane built. This seemed high to the majority of commercial manufacturers who were

holding low expensive planes and, for this reason and also for others, the Cross License agreement was amended on Dec. 31, 1938. There were delicate negotiations to be carried on with both the Army and Navy before the original arrangement could be changed. These were carried on by Samuel S. Brinkley, the president of the Association. He has been in charge of its activities since its inception and to him credit is largely due for the smooth way in which the Association has functioned.

The new scale of license fees is set at two per cent of the selling price of the plane less engine, engine accessories and propeller, and a maximum rate of \$200. That is on a plane selling at \$4,500, with an engine and accessories for which the manufacturer paid \$1,500 \$60 would be paid, or two per cent of \$3,000. This scale will suit small Curtiss Airplane & Motor Co. Inc. has been paid in total of \$2,000,000 for its license and other patents, or used patent No. 1,203,535 expires on Oct. 31, 1939. At the present time about \$750,000 out of the \$2,000,000 remains to be paid. When this has been paid the license fee will be reduced to one-quarter of one per cent of the selling price of the airplane but in no case to exceed \$25.

Those who signed the amended Cross License Agreement of Dec. 31, 1938, became entitled to the use of three hundred and fifteen patents on airplanes, flying boats, and propellers owned by the following companies: Aeromarine Plane & Motor Company, Inc.; Boring Airplane Company; Cessna Airplane & Motor Company, Inc.; Dayton-Wright Company; G. E. Hughes & Co., Inc.; Grubbair Aircraft Corp.; L. W. P. Engineering Company; Glenn E. Martin Company; Padfield Motor Car Company; Stinson Aircraft Company; Thomas-Morse Aircraft Corporation; Wright Aeronautical Corporation.

These companies, and those subscribers who have joined since, have agreed that the Manufacturers' Aircraft Association shall handle the receipts and disbursements of license fees and other incidental business

Infringement claims might be made by the patent owners against practically every manufacturer of commercial aircraft on the basis of one or more of those three hundred patents. Changes in design could eliminate the question of infringement in certain cases, but certain of the patents are absolutely essential to airplanes as designed today.

When new patents are taken out by any of the subscribers to the Cross License Agreement, they are required to submit them to a board of arbitrators which will set a value on the patent, and other manufacturers who desire to use the patent will have to pay this extra fee. This applies only to real developments, or inventions of striking character which have cost money to develop. The object of this is to reward the owners of after acquired patents in proportion to their importance to the industry. The decision of the board is final and all aeronautical patents held or controlled by a subscriber to the Cross License Agreement can be used by any other manufacturer at the price thus fixed. The agreement does not include non-aeronautical patents nor foreign patents.

The subscribers to the agreement will have to report all their existing patents and any patents which they may take out after they have joined the Association. They will also have to make quarterly reports of all planes built and the selling price thereof. Subscribers make payments to their "Company" on the basis of these reports. Besides the regular membership fee for people or all planes and the special royalty fee for those who build airplanes, there are other charges which have been turned over to the company. Royalty fees received from non-subscribers to the agreement and also monies won in infringement suits against outside manufacturers.

The company retains twelve and one-half per cent of all receipts for administrative expenses and for accounting of patents. If there is too large a surplus it will be distributed to the subscribers. Under the Curtiss Airplane & Motor Company has been paid a \$2,000,000, as well as its patents equal a return of \$2 per cent of the receipts. This of course does not apply to the entire royalties which have been paid in for the use of patents taken out after the subscribers have joined the company. Receipts from this source naturally go to the company that owns the patents.

Subscribers will withdraw from the company at any time one year after they have joined, but under the terms of the agreement which they have signed the patents which they owned at the time of their withdrawal will still be available to the other subscribers, but they will have to pay any rights under the patents owned by other subscribers. Therefore, the probability is that subscribers will not withdraw unless they bring out some radical invention and are disappointed in the royalty award made by the Board of Arbitration.

As the original patents, which now control the aviation industry expire, the present license fee per airplane will drop down to a maximum of \$25 and will only be

a few dollars for small planes. The real error of importance will then be with the Board of Arbitration which fixes the rate of royalty which a company may charge for its new patents. The board is not permanent but consists of one representative of the interested manufacturers, one representative of the M.A.A. and a third member appointed by these two.

The company which has just taken out a patent will tell the board that it wishes to receive a company royalty for the use of it. The board has, however, the right to alter the amount asked. As other companies will not desire to use the patent if the royalty is too high, it will, of course, be sound policy for the companies not to ask for unduly high royalties. There will, of course, be a very considerable amount of difficulty in setting a fair valuation on an invention but the method set up by the Cross License Agreement of having one central arbitration board, has worked in other industries and is certainly simpler and less wasteful than for each individual company to negotiate a separate agreement with every other company.

In case of dispute between two subscribers or between subscribers and the company, a board of three disinterested arbitrators shall be appointed. The decision of such boards will be by majority vote and will be final and binding on all parties.

Commercial manufacturers who have not been paying any royalties will naturally be reluctant to join any association that requires them to do so, especially when the majority of the subscribers are military. However, the aeronautical manufacturing group more and more into the hands of bankers and business men, it is probable that they will realize the importance of avoiding patent suits and of coming to some workable agreement for the interchange of patent rights.

AROUND 20 of the commercial aircraft manufacturers have joined the M.A.A. since the revised agreement became effective on the first of this year. At the present time the Associations does not seriously desire any new members it waits for infringers. This is the duty of the companies who own the patents. The M.A.A. is really merely a company formed to make the interchange of patent royalties more simple and to avoid the considerable costs which would now necessarily result unless there were some machinery for the interchange of patents.

It is, of course, possible that when the Curtiss patents expire, that the organization will be out and that each company will negotiate separate agreements with every other company and do their own outlaying of royalties. It is more than probable, however, that under the new arrangements that the M.A.A. will expand its activities and that it will purchase certain patents for the benefit of the industry as a whole, and also that it will defend the industry against the predatory suits of individuals who make their living out of suing people for infringement of patents.



Samuel S. Brinkley, President of the Manufacturers' Aircraft Association

SELLING AIR



One of the daily mailers. Fokker monoplanes operated by Lockheed Air Lines Inc. over Los Angeles field.

WE NEED only look back two short years and recall the difficulties which then beset most air mail contract carriers, to realize the remarkable progress that has been made in the development of air mail services within a comparatively short space of time. Figures recently announced for the first quarter of 1939 indicate that something like 650 tons of air mail were carried during that period by the various air mail lines of this country. With mail loads being figured in hundreds of tons per month it is evident that the American public has contracted the air mail habit and the rate is probably not far distant when all first-class mail will go by air.

Now we are face to face with a new set of problems, those involved with fostering the habit of travel by air. In solving these new problems it is well to consider the lessons to be gained by a study of air mail development.

Before the public would make general use of the air mail it was necessary to accept certain fundamentals. The men of business had to be convinced that the airplane was a serious factor in business, that it was capable of flying from point to point, year in and year out, according to a fixed schedule, and that cargo carried were reasonably safe from damage. At the same time it was necessary to demonstrate the commercial advantages of air means for mail and express. The problems connected with selling air mail were thus divided into two groups, first, those which involved stimulation of interest and confidence; and second, those concerned with actual use of the service available.

The problems which confront the passenger carrier today, although differing in period of detail, are susceptible to a similar classification. With regard to interest in aviation, and confidence in its future, the way

has already been prepared to embrace largely in the recent widespread laying of aviation securities by the public. This general confidence has unquestionably been established chiefly through the remarkable records of the air mail route operators and through the co-operation which the newspapers have given in printing facts relative to these records. It is, however, when we come to the second set of problems, those which involve the actual use of the service offered, that we find the greatest divergence between methods employed in selling air mail and those needed to sell passenger air transport.

It is one thing to send letters and parcels by air, but to commit oneself to the hazards of the sky seems quite a different matter. By now, the air mail service has become such a prosaic and everyday affair that the average man never gives a thought to the fact that his letter will travel perhaps thousands of miles, over mountains and desert, through rain, snow, and darkness, before reaching its destination. This is the very attitude that we must seek to promote in connection with personal air travel, so that the person concerned will think the trip is never realized that a mile down the street is a trolley car. Indeed, the success with which air mail lines are being safely carried is the most convincing argument of all in selling personal transportation, and the one which should be most emphasized.

Unquestionably, the average person does think of the mountains and deserts, the wind and rain, and all the other real or imagined dangers when considering patronizing an airline, and one of the biggest factors that we now overcome in connection with air travel is that of fear. There are, of course, many other factors of importance in connection with popularizing air travel, but the big problem now is to convince the public that it is safe.

This same problem existed on a lesser scale in connection with building up road volume. Many people refused to send valuable papers, or shipments, by air because they feared damage by a crash. This fear has been eliminated, but here is an interesting observation: There are in America some 89,000 government post offices or authorized sub-stations, many thousands of rural vehicles, and hundreds of millions of post marked letters which have been used to support the educational campaign of the private operators in building public confidence in the air mail service. Every post office and

Passenger TRANSPORTATION

truck has been kept plastered with posters advertising air mail, every mail box has carried a schedule of available air mail services; and literally hundreds of millions of letters, reaching every home and station in the country have carried, at one time or another, a post mark urging the use of the air mail. Such a campaign, coupled with the constant efforts of the operators themselves, has produced results, but there is no Post Office Department of the passenger air transport business.

THE PROBLEM of selling passenger service is greater than that of selling air-mail service, but we have no government backing in this endeavor and it is evident that co-operative effort is needed.

I believe that we must establish thousands of ticket agencies in all parts of the country, and sell combined air-rail, air-bus, or air-sea service transportation before we can hope to make air travel the accepted and everyday sort of thing that it must become.

There are many firms to hear out this line of reasoning. Piedmont Air Lines, now operating between San Diego, Los Angeles and San Francisco, has available 1,500 ticket agencies which also sell Piedmont bus



The ticket office of Piedmont Air Lines, Inc. in downtown Los Angeles. Note the advertisement on the side of the building.

transportation. When a customer calls in to ask the fare between these cities, the matter of fact query comes back, "How far is it?" and this sort of thing is doing Piedmont planes in the air with capacity loads. Madden Air Lines, operating between the same cities, has arranged for joint plans and bus service, going out every day, and returning another. Western Air Express has arranged for a round trip by air and water over the same route. Standard Air Lines, operating between Los Angeles and El Paso, sells plane-train tickets jointly with the Texas-Pacific Railway, connections being made at El Paso. Western Air Express has inaugurated a plane-train service in connection with the regular schedule of the Rock Island and Burlington Railways Systems, Pan American Airways, Inc. co-operates with eight different railroads, and these examples of the trend might be multiplied almost indefinitely. Each of these plans provides a tie up between air and surface transportation and at the same time multiplies the number of offices from which the air tickets are sold.

In Germany the Deutsche Luft Hansa operates a combination air and rail passenger service known as the "Flugverkehr", which provides that air passengers may have their tickets honored by any German railroad for the portion of the trip not made by air. This seems an ideal arrangement, if it could be applied to this country, inasmuch as tourism and business travel alike

The renowned international building and passenger terminal at Burbank, California, Inc., Los Angeles.



could travel about the country and change from plane to train, wherever circumstances might dictate, without business end tags.

It is evident that as this movement for combined air-land and air-sea travel grows there will be available thousands of ticket offices to do for passenger air transport what the post offices have done for air mail. Also, as the established surface lines enter the business of passenger air transport the public confidence which these established lines already enjoy will be to a great extent, inherited by the air services which they foster.

HOWEVER, this is but one phase of the problem and there are many others of importance. It is vitally necessary for us to change air travel from the category of the unusual to that of the usual. The great has been of great service about this but the indiscriminate news and publicity, unsupported by an ordered advertising campaign, is a bare vehicle for the accomplishment of this purpose. Surface transport companies are among the largest users of paid advertising space in newspapers and magazines and it seems logical that now, while we are seeking to popularize air travel, it, too, should require substantial paid space. Many air lines throughout the country are already advertising regularly. Perhaps the best example of such a campaign is that which is being which has been conducted by the Ford Institute. If such a campaign could be amplified by a great co-operative organization of all the interested companies, advertising in leading magazines and newspapers, air travel would advance with tremendous strides. Even advertising of this sort must be done in a big way for the smaller companies cannot afford to incur the necessary expense by themselves.

Perhaps the most important phase of such a scheme for a co-operative advertising campaign is that the problem of selling air transportation is not as yet a competitive one. The people at large must first be sold upon the desirability of air travel in general before any particular company can hope to hit its members in particular. A generation from now, when air travel is the accepted thing, competition between air transport companies will be of some importance but it is now.

If such a successful advertising effort should be staged by all interested bus, rail, and water lines, and

with the help of air lines and aircraft manufacturers, the expense could be so distributed as to involve no any one organization and the accomplishment at this time would be out of all proportion to the effort, due to popular interest.

Another aspect of co-operative selling effort is that of downtown depots. The problem of ticket offices will be solved by the sale of air travel tickets from all rail, water, and bus ticket offices, but airports will still be located in out of the way places. Some plan must be worked out by which air passengers can all be headed through one central depot, close to the downtown district, and from which buses will radiate to all co-operating airports. In Los Angeles there are four separate downtown depots for air passengers, one each for Southern Air Lines, Western Air Express, Standard Air Lines, and TWA Airways. While it is better to have several depots than none at all, it seems that it might be best to establish Union Air Depots in leading centers. This would eliminate the confusion which has always existed in connection with rail traffic where there are several stations in one town. Also one depot would be cheaper and more efficient than several scattered depots, and the impression on the public of one large central air depot would be most favorable. An important prerequisite to such a plan is a spirit of central cooperation between competitive, large and small, which although competitors, should recognize what is for the common good of all.

SUCH a co-operative selling and advertising plan as I have indicated must have its operation upon tangible sales points which will show that air transport has something to offer not found elsewhere. Passenger air transport does not yet exist in the United States from a countryside standpoint, nor should it ever exist, I believe, as a thing apart—air transport as distinguished from water, surface transport or as competitive with surface transport. When we are in an aircraft with one of our established transportation systems we will have something definite to sell. A real service will exist when passengers may travel at great speed to all large centers of population by air and from there may be carried immediately to small town destinations by bus or train. Examples of what can be done with a unified transportation service may be multiplied indefinitely.

The thing that creates appetite for the travel of the public is the keynote of the trend and we must all place to place transportation in whatever modes of travel will measure the greatest speed, comfort, safety, or economy, according to the traveler's wish. Aircraft travel on the available travel facilities and that is the fact which must be sold to the public; for it is the big fact that is making air travel development the most vital factor of the world's transport systems. The sooner air transportation attains its rightful place the better it will be for all mankind.

There are, of course, overriding details to be worked out in connection with sales of buses, equipment, etc., but these problems are being solved as a matter of course. The big thing to be considered is that air transport gets off to a right start among the other transport systems of the world, and with the developments now in progress I believe that this start is assured.

THE Medical Section OF THE AERONAUTICS BRANCH

By DONALD E. KEYHOE

"BUT, DOCTOR, it isn't that I can't see. I can see on account of my eyes. I've driven a car 10 years without an accident. And I'll get lenses in my goggles if I have to."

If this pilot has been read over and brought to the attention of Medical Director Stuart of the Department of Commerce, it has been made 500 miles. For the applicant for a student pilot's permit cannot see any difference between flying and driving—at least as far as his vision is concerned.

Doctor Stuart explained this situation very clearly. "There is a big difference. In the first place a man driving an automobile looks straight ahead most of the time. His glasses correct his vision ahead, but if he looks out of the side of his glasses, there is distortion. A pilot must be looking around all the time, and he can't be twisting his head. He has to look out of the corner of his eye, right in glasses look quickly at his instruments, or ahead, or over to the other side. Also, it is very hard to correct visual error by lenses. In minor defects it can be done, but not where vision is seriously impaired."

"Nor does it help to wear glasses under the goggles. The effect is that of having flinders in the water and while increasingly thick air traffic a pilot must be able to see better than ever—out to be impaired."

"Then there is another difficulty. If the pilot with good vision gets his goggles smeared with oil or fogged with mist, he can take them off and rub them clear flying without much trouble in the meantime. But the pilot with special lenses or his goggles to wear a serious predicament if he gets them smeared. He may be in a tight place, and if he takes off the goggles to wipe them he will be completely blinded for a little while. If he is near another plane he may collide with it before he can see it, or if he is near the ground he may lose all perspective and crash. So we have to tell each student applicant whose bad eyes would endanger us only themselves but also everyone near them in the air."

The astonishing argument is almost invariably raised. And many who have become enthusiasts about learning to fly are generally disappointed when they are rejected by one of the Department's oft-mentioned examiners stationed throughout the United States. Appeals from the examiner's decisions are common, and in several cases special hearings have been held. But in almost every instance the applicant has been found on careful re-examination, to be physically disqualified to the extent that he would be a possible menace to other pilots.

The examiners are instructed to recommend waivers whenever there is any reasonable ground for this action. These are then reviewed by Director Hauer. In case of doubt the applicant is requested to fly with one of the Department's inspectors, the latter reports as to whether or not the applicant would be safe in spite of his physical handicap. A waiver may be granted.

This method of referring applicants to inspectors has become a popular way of settling disputes. In one instance, a man with an artificial leg was tried out. Some time before that the Department had issued licenses to men with artificial legs, but one or two accidents afterward resulted in a change of policy. So on this occasion Inspector Kearney was sent out to test the man, who already had had some flying experience.

Kearney found that the man's ability was fair, but that he had poor rather control because he did not have the definite "feel" of the pressure necessary, which came easily through motion of and in the rider. Kearney purposely tried several maneuvers in which this special "feel" is most important—and the applicant failed to handle the plane with a proper degree of safety. He was rejected. His could not be made to see the point required, and he believed he had been an object of this experiment. He had been wearing goggles, which would have called for the "feel" and they were removed under consideration—but these might easily have come a sensation in which he would have been forced to maneuver to get that way.

Very pilot can surely think up situations and emergencies where an artificial leg could not respond quickly enough to avoid disaster. How many plans would come to fly with a one-legged pilot unless that controls were needed?

MANY of the protests received by the Medical Section come from those who wish student licenses or permits. This is natural; for the Department feels it is better to stop the beginners before they really get started, than saving them time and money (for they could not get licensed after anyway. Few experienced pilots have suffered at the Department's hand because of physical disabilities. There have been a few instances of persons being rejected from transport to industrial jobs, but these are only a very small percentage. There have been no permanent rejections from physical causes. Some have been temporarily suspended as a result of accidents but they have been restored later.

When licensing was first established there were some



The ticket office of Standard Airlines, Inc., in downtown Los Angeles

complaints about the medical examinations for. These have practically died out, for the United States fee is smaller than that of other countries, and there is no charge for the license. In Canada the examination is free but the license costs \$25. If the Department of Commerce were to use a different system, examinations free and charging for licenses, or even giving both free, a obviously could not afford to keep 625 skilled physicians and examiners stationed in the United States. It would have to keep only a few, at widely separated points, and then students and pilots would have to travel to these cities to be examined. The cost of travel and food would mean that only the few license and first examinations. Furthermore, there would be long delays at such offices, as there would be hundreds of students being examined, not to mention the renewal examinations of licensed pilots.

THE fee for transport license medical tests is \$15 for the semi-annual examination, \$5, and annual re-examination \$10. For the initial examination license the fee is the same, for the subannual license it is also the same except that there is no semi-annual. The fee for the private license medical is \$30, both for the first and annual re-examination.

Sometimes applicants may have to visit two examiners: one a specialist in eye, ear, nose and throat work, and the other a general physician. There is no charge for the fee. It is paid between them.

Recently, as being rejected by an examiner, a certain pilot made the statement that the physician was a "good doctor, but he didn't know anything about flying."

That may be perfectly true, although some of the examiners are pilots and others are taking an active interest in the game. But it is not necessary for them to know flying—the Department through Director Bantz has drawn up a comprehensive guide for the examiners to follow. They have information on every detail they are to cover. Methods of giving all tests are outlined, as for instance the depth perception test the self-balancing test and finally methods of interpreting the findings. Only good medical ability is needed with such a guide. And the examiners are carefully chosen people where there is no other place where they can get the careful investigation, and co-operation with medical assistants, officials of cities, boards of commerce and others qualified to recommend physicians both as to skill and reliability.

AS THE case with rejected applicants who fail flight test or written examinations, some applicants who fail the medical test have tried to "get by" going from one examiner to another they feel may be a little more lenient. Usually the second test bears out the first decision, but in event that it does slip through the case is caught at Washington. However, if there is indication that the doctor has been corrected, rather than concealed in some way, the applicant has the usual opportunity for being licensed.

There is no set interval between medical examinations. The moment a defect is overcome an applicant may take another test, in some cases, examiners will hold up the papers, giving the applicant a chance to correct the error, if it is of the kind that may be remedied in short order.

One extremely few pilot that the standards are all right in the fact that 80 per cent of the old pilots pass

without waivers. Like the Navy, which in 1933 found that 93 per cent of its pilots were all right on physical requirements, the Department of Commerce holds the opinion that the standards conform to the man, as well as the man to the standards. In other words, good pilots must be in better condition than have a certain number of co-ordinations and so forth. Those who do not measure up to these standards will eventually drop out, either by being killed or injured in crashes, as a result of not being fit, or else voluntarily withdrawing when they realize their danger from this inability.

Of course, there will be some remaining, who are not fit, but who live on through some specially kind Providence. There will always be more of these in commercial aviation than in the Army and Navy air services, because students who fail to get Department student permits may leave as unlicensed pilots under individual pilots. If they survive their training and first solo period, they may acquire enough experience to fly in ordinary circumstances without serious difficulty, though they will still possess physical defects. In emergencies, these defects would cause trouble. Some may be smart enough to realize this and to stay far away from any situation that might develop into an emergency. But these pilots will still be a menace to other pilots and to passengers in the air near them.

THERE HAVE been instances in Department of Commerce examinations where applicants for student permits have been found severely unbalanced, some actually, some to a degree that might be aggravated into dangerous insanity by loss of sense in an unusual incident in flight. Hardly any comment on that is required, except that the most for student State physical standards for all pilots is strongly brought out.

The biggest difficulty with licensed pilots is that they delay in taking their six-month medical tests for renewal, and then complain when they are grounded. The Department has done its best to make this renewal examination easy. The examiner who tests a pilot is authorized to extend his license 30 days on an affidavit of proper flying time, which gives him the opportunity to keep flying until the renewal license is being forwarded from Washington. This can be done on the last day before the license expires. But if the license is allowed to expire, then the applicant has no right, not even one day later, to exceed the license. The usual remedying procedure must then be gone through all over again.

For the future, thicker traffic might cause us call for more and more strictness, resulting perhaps in higher physical standards. But the perfection of automatic controls, radio beacons and communication with better examinations, and other things yet unknown, may render pointing out of a matter where the individual factor counts. It will always be important, but these improvements in technology may counterbalance the increased thickness of air traffic.

But until that is proven beyond the shadow of a doubt—the good old transport business will not be loaded out until the pilot has shown that, physically, he is "up to snuff."

This is the fifth of a series of air articles prepared by Mr. Keyhoe dealing with the Aeronautics Branch Department of Commerce. The sixth will appear in an early issue.—E.

THE ALEXANDER

.32 "Bullet"



1,100 lb and a fuel capacity of 40 gal. The Kinner model has an overall length of 21 ft, 7 in., weight empty of 1,150 lb, and a normal gross weight of 2,250 lb. The high-speed is 130 m.p.h., cruising speed 111 m.p.h. and the landing speed 42 m.p.h. At sea level the rate of climb is 640 ft per min, and the service ceiling 11,000 ft. When powered with the Wright Whirlwind Five engine, the overall length is 21 ft, 1 in., the weight empty 1,340 lb, and normal gross weight 2,400 lb. The high speed is 150 m.p.h., the cruising speed 127 m.p.h. and the landing speed 45 m.p.h. The plane has a rate of climb at sea level of 858 ft per min and a service ceiling of 13,000 ft.

INTRODUCTION of the fingerless "Bullet" marks the advent of the Alexander Aircraft Corporation, Colorado Springs, Colo., into the industrial airplane field. The Bullet is a four place, low overhead wing, cabin monoplane with retractable landing gear and powered by either the 165 hp Wright J-6 or the 100 hp Kinner K-5 five-cylinder, radial air-cooled engine.

A dramatic departure from conventional practice is found in the structure of this airplane. A large proportion of the disposable load is borne by the full-coupler wing rather than the fuselage. This together with the retractable landing gear and other features in the design, distinguishes the plane as a step in the direction of the "wing wing" type of aircraft which is now being developed abroad. Quantity production has been started following a series of test flights.

The G-32 Bullet is the new airplane is designated in the first of a proposed series of six airplanes, a smaller plane to be known as the G-32 Bullet, intended for training and adaptable to power plants in the 50 to 85 hp range will be offered in the near future. The company is also planning the G-45 Bullet, which is to be powered with the 300 hp Wright J-6 engine and its high speed of which is estimated at 175 m.p.h.

Both models of the G-32 Bullet have a wing span of 28 ft 7 in., a wing area of 302 sq ft, overall height of 8 ft 3 in., a dry load of 670 lb., a disposal load of

A complete airframe section designated the 34-11 was developed especially for this plane by A. W. Mooney chief engineer and L. H. Hight assistant chief engineer of the Alexander Aircraft Company. The wing is tapered and the ailerons are made slightly from the top surface differentially controlled. The long elliptical tip makes wheel landing. The wings consist of two outer panels and a center section. The outer panel structure is of wood and fiber while the center section structure is of welded chrome-nickel alloy steel tubing. The center section extends for a short distance beyond the fuselage structure on each side and consists essentially of two booms or four longitudinal members with bracing members. It is even in both the vertical and horizontal planes. The steel

Photograph of Alexander "Bullet"

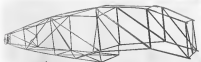


vertical beams of this center section are used as supports for the seats in the cabin. The load of pilot, passengers, fuel and baggage normally acts on this center section to which the landing gear is also attached. When retracted, the landing gear is contained in two compartments on the rear side of this center section. Two 20 gal. gasoline tanks are set into the two center section struts. Baggage compartments are located on each side of the fuselage between the wing spars and ample space is provided in these. This arrangement eliminates heavy structural members above passengers and pilot. The outer wing panel structures are built up of all wood box spars and ribs having wood cap strips and filler in their ribs. Although weighing less than a pound, one of the main ribs is static test supported a rated load in excess of 770 lb. for a period of 30 hr. and has supported 1,100 lb. The strength weight ratio is more than 1,300. Double steel tie rods are used in the drag bracing. The two ribs



being placed as far as possible apart. Drag wires pass through the box spars and are anchored to channelled slots on the outer sides of the spars.

The fuselage is built of welded steel tubing and is designed to carry the engine and tail surfaces, in addition to its own weight, and to serve as a canopy for the passengers. This structure is rectangular in section and considered as being producing a certain amount of lift. The rudder area is set at such an angle with reference to the fuselage as to be vertical when the plane is towing on the ground or flying at high angles of attack. The cabin floor is adjustable by a triple screw thread. Fuselage, tail surfaces and wings are covered with fabric. The landing gear mechanism is simple and consists essentially of a drum and cable that draws the wheels up into two compartments in the lower side of the center section struts. By releasing a trigger, the landing gear can be dropped into position, falling by gravity. It is kept in landing position by a double safety lock. The wheel



Top: The completed fuselage has engine section at the top. Bottom: A photograph of the welded steel tube structure supports at the floor.



Top: A little ballast steel, bolt mounted on the ribs of the aluminum "inlet" tank. The ballast steel takes center weight of the plane, which leaves a large percentage of the disposable load at the floor.

wheel mounted on the inner wing beam is used to retract the landing gear. The tail float, which can be replaced by a wheel if desired, consists mainly of a five leaf spring fitted with an easily detachable hardened steel shoe. The entire assembly is fitted into the fuselage and can be removed easily when necessary. One shock absorber and shock struts are used on the landing gear and landing can be furnished when a tail wheel is desired.

Windows on the side and top of the fuselage provide light and visibility for the cabin, which is 9 ft 3 in. long, 3 ft. 2 in. wide and 4 ft. deep. The interior is finished with a light gray buffing and darker gray



Top: A side view of the "Wheeler" five powered "Wheeler" (left) showing the location of the engine and the main wing of the airplane showing the curved wing and the main fuselage.



below. Each seat is constructed and a carpet is provided on the floor. The two front seats, placed side by side, are adjustable for comfort of varying angles, and may be swiveled if desired. Two seats similar in arrangement are placed on the rear beam of the center section. The cabin is entered through a door at the rear and one of the rear seats folds up in the wall so such a entrance is to allow easy access to the pilot seat. There

is considerable extra space behind the rear seats which, while not normally in use, adds to the impression of spaciousness.

Dead stick control is provided in front and either stick may be easily and quickly removed. The stabilizer also may be adjusted to the pilot's position. The rudder over the pilot's seat is intended not only for visibility but for parachute exit in cases of emergency. This window is so designed that it will spring open when the stick is released by simply throwing on the top of the stick. All controls are operated by pushbutton tubes and there are no exposed control levers at any point in the system. Inspection windows are placed at important points for examination of the critical parts of the control system. No instruments are included in the system or in any part of the plane. The entrance door to the cabin is so placed that the hinge line is perpendicular to the ground in landing position.

The specifications furnished by the manufacturer are as follows:

Wing span	38 ft. 7 in.
Wing area	232 sq. ft.
Weight empty	8 ft. 3 in.
Pay load	620 lb.
Disposable load	1,000 lb.
Fuel capacity	40 gal.
With Kinner 100 hp engine:	
Length overall	21 ft. 7 in.
High speed	150 m.p.h.
Cruising speed	111 m.p.h.
Landing speed	42 m.p.h.
Climb (sea level)	640 ft. per min.
Service ceiling	11,000 ft.
Normal range	883 mi.
Fuel consumption	6.5 gal. per hr.
With Wright 95 hp engine:	
Length overall	21 ft. 1 in.
High speed	150 m.p.h.
Cruising speed	112 m.p.h.
Landing speed	45 m.p.h.
Climb (sea level)	836 ft. per min.
Service ceiling	15,000 ft.
Normal range	612 mi.
Fuel consumption	8.3 gal. per hr.

A portion of the wing structure of the "Wheeler" the method of wing spar attachment is shown.

PERSONNEL

MAJ CHARLES H. BERNARD, formerly commander of the Headquarters Ground Support Squadron, has been appointed director of schools of the Cavalry Flying School, Fort Rucker, Ala.

LTJG JAMES W. FRANKS has been appointed division superintendent of Western Air Support at Dover, and **LTJG LARRY W. GOSW** has been appointed assistant to the general superintendent in charge of operations at Fort Angeles.

CAROLAN RUSSELL SCOTT has been placed in charge of the aircraft delivery division at the MacLachlan Manufacturing Corp.

DR. JACQUES H. DE VRIES has been placed in charge of the American Eagle Airline Corporation, Kansas City.

W. HENRIKSEN has been elected president of the Phoenix Aircraft, Inc., of Peed in Las Vegas, N. H. **WALTER WHITE**, president, and **D. E. BURTON**, secretary, at a recent annual meeting.

In addition to these, **H. H. PERIN**, Jr., of Air Associates, W. B. SMITH, of A. T. BRENNAN, S. O. WYATT and F. W. M. have composed the board of directors.

DOROTHY M. CAMPBELL, former Washington, D. C., general manager of the Montgomery-Ryan Aircraft Corporation.

JACQUES CHASSIN, plant at the HECAT Wing, Republic of Vietnam, has been appointed chief pilot of the Ohio Lockheed Sales Corporation at Akron.

PAUL G. CLARK has been appointed assistant chief manager of the American Aircraft Corporation under the company's new deferred payment plan.

DAVID E. NEVILL has been named assistant traffic manager at the American Aeronautical Corporation with offices at Kalamazoo, Mich.

ARTHUR H. VEXTER has been appointed general manager of the American Submarine Aircraft Corporation, Detroit.

J. H. MAIR has been appointed director of purchases at the Lockheed Aircraft Corporation, Cleveland.

GEORGE HORTON, formerly Station Aircraft Corporation chief pilot, has been named to become vice president for the Stallion Aircraft Corporation, New York City.

LARRY WANDER now in charge at the New and Ballistic station, Atlanta, N. D. is now to go to Cleveland Airport for a month's instruction in the transfer system from before being placed in charge of the station at Cheyenne Airport.

ROBERT M. GORTON, former W. R. of W. R. Smith, and **JAMES P. WATSON**, of Boulding, are the new members appointed to the Pennsylvania

State Aeronautics Commission. **MAJ CHARLES J. RUSSELL**, of Andrews, and **HAROLD ALAN TAYLOR** and **J. SYMONS**, of Philadelphia, are the other members of the commission.

FRANK HAY, JOHN VAN N. LUTHE and **FRANK HAYMOND**, formerly of the Virginia School of Flying Services, have joined the T. C. Ryan Flying School, New Delta, Calif.

LARRY WILLIAMSON, formerly aircraft operations officer at North Island, has been placed in charge of the commercial instruction at the T. C. Ryan Flying School.

CHARLES B. HILL, formerly of the Master Flying School, Spokane, Wash., has joined the United States Army of Spokane.

CHARLES H. HILL, Spokane, Wash., will become traffic and support manager and general passenger agent for the United States Army on June 1.

E. S. RAVENHURST, treasurer and member of the board of the Valley Aircraft Company, Highland, Pa., has been elected director of the Commercial Aircraft Corporation, Chicago.

THOMAS R. McLENNAN, **WILLIAM HARRIS**, **CLAYTON JOHNSON**, **BRENDEN TATE**, **SAM COFFMAN**, A. L. THURMAN, and **W. H. McLENNAN** have been named to a newly formed committee to draft and enter a set of rules for the Oklahoma City Municipal Airport.

J. L. POWERS, **CHARLES C. GARDNER** and **M. T. BENTLEY** have been added to the staff of pilots, with the Russell Aircraft Corporation, Oklahoma City.

VIRGIL R. BARNES of the Coca-Cola Bottling Company has been elected vice president of the Columbia Manufacturing Corporation, Chicago City.

ROBERT C. R. VANCE, **HAROLD SMITH**, **H. C. MURPHY** have been named directors.

W. H. HARRIS, chairman of New York, has been elected vice president of the Gates Aircraft Corporation.

JOHN STRAUSS, formerly of the Federal Aircraft Corp., has joined the Gates Aircraft Corporation as chief of finance construction.

FRANK KASPER, formerly of the Central Aircraft Corporation, Chicago, and the Valley Aircraft Corporation has joined the Gates Aircraft Corporation as head of the manufacturing department.

A. C. THOMAS has been named assistant instructor in the night ground school at the Pennsylvania branch of the Central Aircraft Corporation.

J. G. TAYLOR, **BARBARA L. L. E. GARDNER** and **LEWIS B. SMITH** all of Portland, have been named new members of the Oregon State Aircraft Association by Gov. E. F. PATTERSON.

JOHN and **WILLIAM** of the board are **LOUIS**, **A. B. HARRIS** and **ALBERT SMITH** also of Portland.

C. G. A. ANDERSON has replaced **V. E. JAMES** in charge of the Cleveland Airport, and **JOHN P. WATSON**, of Boulding, is the new member appointed to the Pennsylvania

control station there. **ANDERSON** moved to Cleveland from Dallas, Tex., and **WATSON**, N. J., state he has had charge of the airport station before.

LLOYD L. F. DONAGH, army pilot stationed at Fort Custer and Fort Riley for the past three years, has resigned his commission to become a pilot for the Boeing System.

Completion of the New York State network of air weather stations has been announced.

The new for the T.A.T. transportation survey is expected to be in the neighborhood of \$100,000.

On the road, passengers and company planes of the Pacific Air Transport, Inc. 751 665 in the year ending May 1 with only 21 days more scheduled, it has been reported.

Tampa, Fla. will celebrate June 10-15 as aviation week.

Boeing Aircraft Company has opened for a year's supply of (A) Boeing aircraft are reported, suggested by the results of the recent Air Corps maneuvers in Ohio.

Buffalo airport now incorporated with the New York airport now is located in the city of Buffalo, N. Y., at a new airport built June 1.

Commercial plans for the Douglas Aircraft Co. to build a new 100-passenger transport plane at \$100,000 a month with the city.

Heavy rainstorms wrecked the Western Air Express plane in the Los Angeles-Culver City line at Culver City, June 2 while it was on the airport.

George Ward of the Irving Air Chute Company, Buffalo, has returned to duty on an extended leave abroad organizing branch factories of the company in Central Africa.

F. Thomas Dugan, assistant Secretary of War for Aeronautics, has returned to Washington after a 7,000-mile inspection of Air Corps activities.

N. W. WATSON and Pilot HARRIS are in a good-will lecture tour under the auspices of the Institution of Aeronautics, Inc. 120 Broadway, New York City. They fly from time to time and address meetings of aviation.

Six engine Commanders have been appointed for engine testing are to be put in operation by the National Flying Service of Texas at Houston.

What has been completed of the new racing airplane at the Philadelphia Navy Yard for Lt. Col. A. J. Williams is being closely guarded from curious eyes, following the leaking out of information about the machine through one of the Philadelphia newspapers. Naval officials will normally have had closed that place is being built.

General Aviation Corporation is reported to be negotiating for the purchase of an airplane manufacturing company in South America.

For an airport site of about 200 acres within a radius of 10 miles of Los Angeles.

Byron K. Newcomb, chief pilot of the

BRIEFLY

T.A.T. will begin operations July 8, according to the most recent schedule.

Government test of the Adams pickup-truck device for an auto is to be held in Cleveland by United Bell, Inc.

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Western Aircraft Company, Cleveland, and E. J. Mitchell of Continental Air Lines, Inc., are reported planning to make an attempt to use a new aviation device.

George J. St. Louis, president of the Aero Supply Co., Collins, Pa., has bought a General Aviation which is to be flown about the country to a flying school, and a display of the company's products.

Port New Standard road planes have been delivered in Oakland, Calif., to the operation of the Philadelphia-Cleveland route.

A new report of failure, and to be the rubber tire mounted has been the subject of a letter from the California Air Corps, which is the subject of the 1935 California, Louisville, Ky.

New aircraft types to include a two place lightening plane, but bombing plane three place observation plane for low altitude work and training on ground are now reported, suggested by the results of the recent Air Corps maneuvers in Ohio.

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TRADE TIPS

It has been reported that

The city of Chattanooga, Tenn., is taking bids on a new aviation terminal, light and building construction, as its municipal airport, according to H. H. HARRIS, Assistant, 1411 Massachusetts Avenue, Washington, D. C.

John W. Reed, Dayton businessman, is taking bids on a new aviation terminal, light and building construction, as its municipal airport, according to H. H. HARRIS, Assistant, 1411 Massachusetts Avenue, Washington, D. C.

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FOREIGN ACTIVITIES

French Produce
Three New Machines

PARIS (FRANCE)—Three interesting planes have been developed in France recently. The first is the Hispano H5 low wing monoplane, powered by four Hispano-Suiza 250 hp. engines, which has been designed for long distance, road transport. The engines are grouped by two in tandem arrangement on the top of the wing. The second design is arranged with side-by-side seats.

Another machine is the "Toucan-Aster," a military reconnaissance built by Lorraine Aviation. It is powered with a Hispano-Suiza engine, which is capable of driving the machine at the rate of about 160 m.p.h. There are two interesting features of this machine. One is the enclosed cockpit for the pilot and the other is the novel design of the fuselage. Directly behind the pilot's cockpit, which is behind the pilot's cockpit, the empennage is supported in a boom. It is expected that the all-steel construction will make a very delicate step in French aeronautical construction methods.

What is called the Aero-Silence 100 CL has been produced in a recent flight. It is a monoplane highly streamlined and has the following characteristics: 100 hp. engine, 100 m.p.h. cruise speed, 10,000 ft. 171 m.p.h., 32 ft. span, length, 19 ft. 7 in. Another is the light touring plane produced by Duple-Breton. This plane, powered with the Hispano A. D. 6, of 60 hp, and having a cruising speed of 100 m.p.h. at 10,000 ft., has a 23 ft. span. This represents another effort of French aviation to produce a plane for the private owner and sportsman.

Propose Rotterdam Meet

ROTTERDAM (HOLLAND)—Holland's plans are being made for the four-day program of the second annual international "Light Plane Meeting" June 22-25. Invitations from many European countries are expected. The flying trials will be interspersed with social events and it is hoped to make this year's meeting as brilliant a success as last year's. The principal discussion topics of take-off, landing, speed and altitude tests and a cross-country flight. The participants are invited to light planes.

Canadian Promote Race

HIGH RIVER (ALTA.)—An air race between Tulsa, Okla., in the heart of the American oil fields, to this community in the heart of the Canadian oil fields, will start July 4.

Planes to Link The Mias

LONDON (ENGLAND)—Flight transportation between its properties in Malaysia, Burma and India, is being sought by officials of London Tin Societies and petroleum dealers for air lines to transfer engineers and to transport oil and materials between these points in being made. Airplanes probably will be used.

Foreign News Briefs

Kinshasa, Congo, declared its airport for a special flight being made by a plane that city, Congo, and Kinshasa.

On June 6 to 8 Hamilton, Ont., declared its 201-acre airport.

After plans are being made in Buenos Aires, the Secret of Air Command to launch a flight from Moscow to the United States by way of Alaska. The plane is to be built with its main line in the following pilot: Shneider, Sokolov, Shcherbakov, and Machine Fokker.

Verified fact as a production airport was just out in Portland, Ore. From June 27. Chemically generated smoke belated from a great number of jets but not before it did so to the owners of the experience.

It has been known that Flying Fellow, R. Owen, who with Hightland, who landed in an island near Cape Good, Australia, on an emergency flight from London to Scotland, was in a group of pilots from the plane while in flight. The machine of his single when more trouble caused the plane to faller 100 ft. 41 in.

As a result of the experience of these two pilots the need for radio beacon on the Continent has been urged by the transportation companies operating there.

Van Leeuward, of Baltimore, Md., has received his 2000-hp. flight to the United States of May 21 from Cebu, Philippines. His request has been reported since the favored landing on the Southern coast of Florida on his return from Cebu, Texas.

An tramp service between Buffalo and London has been started, the airplane leaving Berlin at 2 a.m. daily, coffee at 10:00 a.m. and 10:00 a.m. arriving with mail and freight at London at 10:15 a.m.

English Bristol Beaufort and Bristol Beaufort are reported to have been sent by the Mexican army to the nearest military emergency in that country.

Describe Details
of R-101 Construction

LONDON (ENGLAND)—The first plane recently developed out of the interesting details of the R-101, under way in the R-101, both of which are being completed at Pullman. France 1 contains a longed distance of airplane which may be located for entry of passengers from the morning travel. The passenger must take their cabin from the platform by means of a staircase on the corner 2 ft. 4 in. wide along the port, bottom longitudinal girder which is affixed with holes and holes for electric lamps every 20 ft. Frame 3 is a novel type of ring without radial bracing, which is possible in this design. As yet 41 other losses to be including frame 13.

Frame 4 carries two power cars. Frame 5 carries a light body, say, a cockpit on top of the dirigible. Frame 6 and 7 carry passenger cabins. Frame 8 carries two engine cars. Frame 13 carries a single engine car. Frame 14 and 15 carry the gas structure. There are 60 mm. main longitudinal girders which are affixed with holes and holes for electric lamps every 20 ft. Frame 6 and 7 are transverse beams. There are fifteen in immediate longitudinal, which are at the rear longitudinal in carrying the lateral bracing structure by the center over. There are sixteen gas bags.

New Flat Wire Error

TURIN (ITALY)—The Fiat A. 5, a 50-hp. engine, is the first of the new type for three variable, for use in a submersible form, is a partial flat plane having thin construction, powered with a 35 hp. four-cylinder engine, known as the Fiat A. 30, developed particularly for this plane. The plane has a span of 34 ft. and a length of 21 ft. 9 in. The back of the motor stage already and is tied with a window giving wide view. The engine is a four-cylinder, 35 hp. model (model), developed by Fiat at 1600 rpm and 55 hp. at 1800 rpm in 1945-25 ft.

African Air Taxis Viable

CAIRO (EGYPT)—Air taxis for business, now being expected in this section is expected to be extremely profitable and economical on account of the present difficult transportation between cities and large many places. Landed at one of the many airports are paid \$125,000 a year salary and less much more by slow travel, it is expected that the plane will be used extensively to get down this line of air. Due to the generally flat nature of the land, landing areas are available everywhere.

THE BUYER'S LOG BOOK



Pioneer Clim Indicator

AN INSTRUMENT that shows the rate at which an airplane is climbing or descending has been developed by the Pioneer Instrument Company, 734 Leongton Ave., Brooklyn, N. Y., and is known as the Pioneer Clim Indicator. This device is a highly sensitive differential pressure gauge.

It consists essentially of a metal diaphragm one side of which is directly exposed to atmospheric pressure and the other side of which is connected to atmosphere pressure through a capillary tube. The diaphragm is also connected to a thermally insulated tank so that the indications of the instrument are not affected by changes in the temperature of the air.

As the altitude increases the decreasing pressure is transmitted naturally to the directly exposed side of the diaphragm and more slowly to the other side through the capillary tube. The difference in pressure between the two sides causes the diaphragm to expand or contract and the movement is transmitted to the hand. The movement of the diaphragm and consequently that of the hand is proportional to the rate of change of altitude.

Air is admitted to the instrument by means of the connection at the rear of the case marked "vent." On most airplanes the pressure behind the instrument board varies only with the altitude and no air connection is required. In some planes, however, fluctuating pressures are found behind the board and the special vent connection must be used.

The clim indicator is an important instrument especially in flight flying. In its use it is similar to the barometer and link indicator in that it enables the pilot to maintain the proper floor and air level. As long as the hand remains at zero the airplane is neither rising nor losing altitude. The instrument is also useful in measuring maximum rate of climb either in performance testing or in regular service. A combination of this instrument and a sensitive altimeter has been developed for use in aerial navigation.

The Pioneer clim indicator, type 374 (and type 374-C which is the model combined with altimeter) is produced in ranges of 2-42 (thousand ft. per sec. and 30-10 in. per sec. It is also available in special ranges of 1-40 and 5-45 thousand ft. per sec. and 2-5 and 25-25 in. per sec. The weight of the indicator is 0.8 lb., and that of the tank is 1 lb. The construction weighs 0.1 lb. The indicator is installed in the instrument board while the tank may be located at any point within 3 ft. of the indicator where it is not subject to violent temperature variations. The length of the connecting tube between indicator and tank must not be changed. Excessive tubing may be coiled up.

"Buffalo" Aircraft Products

SEVERAL aircraft products are included in the equipment manufactured by the Buffalo Forge Company, Buffalo, N. Y. These include air dynamometers, special oil fans, nut burners, blowers for air preheating and heating treating, exhaust systems for removal of heat and fumes and for ventilating purposes, and mechanical draft apparatus for power plants.

The air dynamometers are essentially flat bladed fans with non-overlapping horsepower characteristics which furnish wind blast over exposed to be tested. These fans are also used to absorb the power developed by the engine. The engine shaft is directly connected to an electric generator which in turn furnishes power to the motor driving fan. Air cools for the fan have been developed to approximate as nearly as possible the conditions encountered by the engines when actually in flight.

The company furnishes large tests for testing complete engines, smaller tests for engine cylinder test and the tests to verify of the exhaust gases. Air dynamometer equipment can also be supplied for direct attachment to aircraft engines without the intermediate electrical equipment previously mentioned. With this arrangement engines can be mounted on cradle type dynamometer stands and the fan equipment will provide wind velocity over the engine and absorb the power developed.

The suspended type "Blossom-Fin" test houses manufactured by the company are used in a large number of airplane factories and hangars. These units which are made in several sizes have completely enclosed motors obtaining full blast. When testing padding bathes are roof rubber covered and fans are desirable. These fans are built with rubber ventilation to the wheel shaft and velocity of air flowing so that it does not come loose, crack or decay.

Danley Spring Chart

A COMPLETE line of springs manufactured by the Machine Specialties, Inc., 2125 South 32nd Avenue, Chicago, is given in table form in a recently published work chart. This chart is intended for use by designers, tool and mold manufacturers, for pattern makers and also for the manufacturer of springs, wire, plate and knock-out springs. All dimensions, loadings, inside and outside diameters and deflections are given for 80 types of flat coiled springs and 85 types of square springs.

These springs are designed to fit standard die drill holes and are working at on the inside diameters. For Danley spring bolts, 100 springs of the same size give uniform deflection. All coils are ground square. There is such a wide range of sizes (from 200 to 1,500 lb., one inch to 12 in. in length and 2 to 2 in. diameter), that, in making of dies, etc., these springs cover practically every requirement.



SIDE SLIPS

By
Robert R. Osborn

Our recent discussion of color not only seems to have started another "hot" item, it has also become a "side slip" in a photograph and a newspaper description of a plane just delivered to new airline, which he thinks should run a championship of some sort. The only possible competitor for it that we can think of has been almost forgotten from the air—the old standard with the original colors of Army days the fuselage painted with camouflage and the fuselage advertisement, the wings showing a dense layer of various colored paint which had been advertised in the old estate drives, cruises and cotton sales and the whole plane painted and draped with streamers and flags the underlying paint could find. The newspaper account shows that this slip must be a case of glory too.

The standard has a very striking color scheme. The wings are painted yellow, on top and green underneath. The tail planes are yellow on top and green underneath. The fuselage is green and white diagonal. The body is painted green on the upper half and purple on the lower half, with a



condition line running from the engine to the tail, dividing the two colors. The windows are treated in camouflage. All external bearing is purple on the left side and yellow on the right. The pistons are green with yellow and purple dots.

Mr. J.B.D. of Denver, Colo. sends in the following new news without comment: "Denver, May 26. I.N.S. II men have discovered to victims in the further shops—they suggest will supply him in the case. Mr. Williams put a new look in things when she gave Mrs. Arthur B. a permanent wave in a Ford Club plane which arrived there the day after the Ford Airport recently." Of course this is interesting as a publicity stunt, but the idea isn't practical. The headlines some of these girls make would start anybody's hair on end and take even a person were out of it.



"FOR FLYING-CLAN CHIEFS BY AIR"—Headline. The Liberty Airplane Club has had some members in that recent confusion too.

We take the liberty of reprinting the following clever comments from the columns of Mr. Stuart Cruise in the New York Evening Post: "A woman aviator, under arrest for having a man, says he acted in self-defense, which would make it so to speak, a formal looking."

For almost reasons the man has a loss caused from the following note from H.P. of New York:

"A fellow wrote in to see the other day about an air school, saying something the enrollment—(which is five) but is a young man, 20 years old, who doesn't want to fly but wants to know the scientific end of the game first, and Mr. Williams put a new look in things when she gave Mrs. Arthur B. a permanent wave in a Ford Club plane which arrived there the day after the Ford Airport recently."

Mr. C.J.H. mailed us the following note and clipping from the Fort Worth H.P. "I was... It appeared that the last moment that the take-off would fail, however, as the plane reached the further side of the field the pilot released the wing gear and ingeniously the plane rose, and just reaching the state and the tires, and the pilot was now safely in the air"—on which C.J.H. comments: "The picture seems to reveal a place I used to fly, and if this is correct I have at last found why the way was too good to refuse flying and hopping over trees. I never knew anything about 'hopping the rising gear,' always depending upon my elevators and under to go up and over."

In the same clipping as the foregoing is an interesting instance, which

confirms the average pilot's thoughts on the importance of the owner of the ship he flies. "Taking all circumstances into the plane, the pilot prepared to take off, leaving the owner of the plane behind."

OUR HONOR FLYING DEPARTMENT

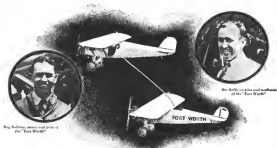
A friend of mine says he was at an estate held on a very foggy day in the middle of last winter when a plane came in from a long cross-country trip. Just as it was about to land the pilot opened it up again and made another pass at the field before landing. When the plane touched up to the line the mechanics, who were in the back cockpit, leaned over to the pilot



and said, "What did you go around the field for?" The pilot answered that he hadn't landed the first time because he thought he had seen a house coming up so he went out of the fog. The mechanic said, "Well, I don't believe I've ever been so cold in my life before and I've been thinking for the last two hours that I couldn't stand it another minute but say show you about now you a house coming up at you end of the fog, it's all right with us to go around again."

We hope that The Society for the Advancement of Robertson of Artists and Newspaper Reporters will be able to get the action desired to stop letters in operation soon so conditions in Wall Street seem to be getting more and more. For instance the following was added last night to the next advertisement: "We have a stock brokerage house, to Mr. A. V. of Fremont N.Y."

"With the new model installed as a pilot, our new office, which is being placed to Elmer Airport in New York and generally demonstrated its ability to climb 4,000 ft. in approximately 10 seconds without stalling." A. V. of Fremont who viewed the demonstration were considerably impressed it is noted.



Big Robbins, owner and pilot of the "Fort Worth"

Refueling the "Fort Worth" with TP Aero Motor Gasoline on her flight which began at 11:13 a.m. on Sunday, May 19, 1939, and lasted until 4:05 p.m. on Sunday, May 20, making a world's endurance record of 121 hours, 32 minutes, 12 seconds. This breaks the former record by 11 hours, 32 minutes, 10 seconds.

"TP- SOLVES THE PROBLEM OF AERO MOTOR LUBRICATION."

(Signed) Reg Robbins

IN a letter addressed to the Texas Pacific Coal and Oil Company Reg Robbins says:—

"During my recent endurance flight in which a new record was set at 121 hours, 32 minutes and 12 seconds, your TP Gasoline, TP Aero Motor Lubricating Oil, and TP Aero Blocker Arm Lubricant were used exclusively and gave perfect performance throughout the flight. The motor in my ship, Fort Worth, had had approximately 325 hours before starting this flight and was still operating smoothly when we were forced to land on account of an accident to the propeller. The oil strainer was not cleaned during the flight and the valve tappets in several but seven-thousandths of an inch was. Having used your products exclusively for the last year I was confident that TP Aero Lubrication was concerned there would be no cause for worry. I believe that your oil and rocker arm lubricant have solved the problem of aero motor lubrication. The record itself is sufficient proof of the results secured using Texas Pacific products."

The products referred to were supplied from the regular stock at the Fort Worth Municipal Airport.

TO STAY IN THE AIR USE -TP- PRODUCTS

TEXAS PACIFIC COAL AND OIL COMPANY
FORT WORTH, TEXAS

New York St. Louis Los Angeles

-TP-AERO MOTOR LUBRICATING OIL
PATENT PENDING

Texas Pacific Coal and Oil Company, Fort Worth, Texas

Please send me, without obligation, your TP's Log Book.

Name..... Address.....

Your Oil Dealer's Name.....



Right off the old front porch . . . it's the light plane for training and sport



If there's any light plane that comes up to the requirements of the flying instructor and the flying sportsman, it's the ship that has left its water a string of records and years of air miles as a training, club, and touring plane.

In its unusual ability to put the horizon between its wheels and the ground in a very short distance, the Avian gives the experienced pilot something to think about.

But unusually quick take-off is only the prelude.

But the Avian through its pores fly through all sorts of weather. Try to throw her into a spin. See what happens in a side-slip. That's one a landing . . . You've never flown a ship more successful in turning a level course. Spas are out in the bag, neither are slips.

For the genius of designing has given this famous light plane the capacity for a remarkable flying performance and a generous safety factor of 1. Added to the inherent safety and stability of the Avian, Handley-Page wing slots are standard equipment. They help to prevent spins and slips, lower stalling speed and decrease landing speed.

famous in Europe

As a training plane, as the plane flown by record-making pilots the Avian is famous in the flying circles of Europe. It is popular as a club plane. Sportsmen use it for touring because it is economical, easy to handle, steady and most of all, parsimonious.

Ten days delay has not dimmed performance. The Avian has the speed, the airworthiness necessary to achieve records. Winona France once England to Australia . . . from

solo flight between these two continents . . . fastest time England to India . . . first non-stop flight London to Rome.

Now It Rides America's Sky-Line

Under sole royalty rights the Avian is now being produced in this country as the Whitley Avian. It's the same ship with a different name.

It offers the flying instructor the opportunity to turn out skilled flyers at lower hours, with less expense and without the hazards that usually attend the task of teaching a fledgling to fly. Its upkeep is low-key. Easy to maintain. Economical in the air and on the ground.

And the man who wants to fly has even ship, either for business or pleasure, will find in the Whitley Avian everything that he can desire. Speed and durability. Safety that no other light plane can approach. Sturdiness. Quickness in take-off as well as ease in landing.

Here Are Its Specifications

Power Plant: Curtiss Mark III, 95 H.P. air-cooled, four-cylinder in-line aircraft engine. Famous for economy of operation and maintenance. Top overhead at 100 flying hours. Economy of operation: 10 miles to gal. of gas . . . 100 miles to gal. of oil . . . 1000 miles to 100 p.h. cruising, 75 m.p.h. . . landing, 55 m.p.h. . . Climbing 15,000 feet . . . Cruising Range: 5 hours or 450 miles . . . (Single Light, 875 lbs. . . Ambulance 1,000 lbs. . . Top, 1,100 lbs. . .) Dimensions: Wings span, 38 ft.; Width folded, 9 ft. . . Height Overall, 10 ft. 6 in.; length overall, 24 ft. . . Price: Only \$399, Flyaway or F.O.B., Bridgeport, Conn.

It Sells as Performance

It is doubtful if there is any light plane better adapted to every day flying needs. Certainly there is no light plane more economical and safer to fly, easier to maintain. And the Whitley Avian performs every-thing, more and conquers every character with the ease of a born aviator.

There's Money To Be Made

National distribution of the Whitley Avian is being completed. Representatives in some of the leading aviation centers of the country is being arranged. Interested and responsible parties are invited to write for further information concerning our sales plan.

Whether interested as the Whitley Avian as a flying school bus or as a sportsman, writer or we will gladly send you complete and detailed information concerning this famous light plane. Dept. 2-4, Whitley Mfg. Company, General Office and Plant, Bridgeport, Conn.



THE OUTSTANDING SPORT AND

THANK YOU for receiving AVIATION

TRAINING PLANE OF THE WORLD

THANK YOU for receiving AVIATION

RYAN



Photo—Robert Robbins, Fort Worth, Texas

A new world mark for sustained flight was set by Robbins and Kelly in a Ryan Brougham on May 26, with an officially recorded 172 hours and 32 minutes.

The Associated Press report said of this flight:

"Robbins and Kelly, by their feat, eclipsed the best mark for single-motored, dual-motored and tri-motored planes and lighter-than-air machines and all records for crews regardless of size."

The industry owes a debt of gratitude to these hardy and courageous men for demonstrating the reliability, endurance and safety of a good ship. The result is not merely proof of Ryan prowess

but a splendid triumph for aircraft and especially for the mono-motored and mono-plane type.

The Associated Press said further of this epochal flight:

"Examination of the plane showed the motor was still in good condition and probably could run many more hours. The Whirlwind engine never missed a beat in the seven and one-half days."

The plane stayed in the air a day and a half after the propeller was damaged by striking Kelly's safety belt buckle, and during this time, withstood tremendous vibration.

Seventeen refueling operations were performed by a second

The New
Model



Brougham
For Six

SISTER SHIP OF THE "SPIRIT OF ST. LOUIS"

THANK YOU for making AVIATION

AGAIN!



Photo—Robert Robbins, Fort Worth, Texas

THE RECORD—172 hours, 32 minutes, ten stops

THE PILOTS—R. L. Robbins and James Kelly

THE SHIP—Ryan Brougham, named "Fort Worth," powered with Whirlwind J-5 engine

THE TIME—May 19—11:33 a. m. to May 26—4:05 p. m.

THE PLACE—Overy Mancham Field, Fort Worth, Texas

BEST PREVIOUS RECORD—150 hours, 50 minutes made by U. S. Army Ship, Aviation Mark

Ryan ship owned by the Midland Oil Company and piloted by Hoffman and Jones.

The ship, which set the new world mark left the factory in November, 1927, and since that time has had hard and continuous use. After the flight, Robbins authorized this statement:

"My Ryan has carried me anywhere I wanted to go and I knew it would carry us through to a new record."

By dramatic coincidence, the second anniversary of Lindbergh's arrival in Paris occurred while Robbins and Kelly were setting their new world mark. Lindbergh's ship, the "Spirit

of St. Louis," was, as the whole world knows, a Ryan Brougham.

Again and again, in all parts of the world, performance has demonstrated that Ryan principles are right. Engineered for years of service, Ryan has the stamina to meet the most extraordinary and rigorous tests.

The latest model Ryan Brougham has, built into it, the same qualities of endurance that distinguished the "Spirit of St. Louis" and the "Fort Worth." Robbins and Kelly will continue to fly a Ryan—it will be the new ship powered by a Wright 300-horsepower engine. **THE MAHONEY-RYAN AIRCRAFT CORP.** Lombard, Ill., Louis Airport. *Aviation, St. Louis County, Mo.*

Department of Commerce Approved Type
Certificate No. 241

The New
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Brougham
For Six

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We are also Chicago Dealers for

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We are interested in receiving inquiries from responsible aircraft dealers and airport operators, and pledge to them a degree of co-operation in sales and service which has not been known in the aircraft business here-to-fore.

Two Stinsons are in service at all times, a Senior 6-place ship powered with the new Wright Whirlwind 300 Motor, and a Junior 4-place ship powered with the Whirlwind 165 Motor.

These ships tour the territory each week and will stop at any city having an airport, upon request.

Our dealer propositions are fair and offer a chance to make an interesting profit.

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Write For Our Terms.

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WACKER DRIVE AT WABASH
CHICAGO

Phone: RANDOLPH 1947

CHARLES B. CHAPMAN
President
ARTHUR W. KILLIPS
Vice-President

STINSON AIRPORT *A Safe Flying School*

Thorough, careful training for men or women who wish to fly for their own pleasure or those who intend to make flying their profession.

Our instructors are licensed transport pilots chosen, not only for their personal efficiency in flying, but more for their rare ability to impart their knowledge to others.

Stinson Airport is the finest, best equipped private flying field in the Middle West, and Student Training is given first place in our field activities. Students are not barred Saturdays, Sundays and holidays as on commercial ports, but can continue their training during all daylight hours, seven days per week.

We have all courses from solo to transport license, and in three years experience have not had a student who has failed to pass his examination.

STINSON AIRPORT
JOLIET ROAD (State Route 4)
AT EAST AVE.
LAGRANGE, ILL.
Phone: LAGRANGE 500



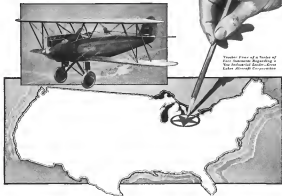
The **ARISTOCRAT** *of the Air*
All That the Name Implies

{ Safest, Finest and Best Performing }
{ Small Cabin Monoplane in the World }

Illustrated folder sent on request

GENERAL AIRPLANES CORPORATION
BUFFALO NEW YORK

Location..



Tracing Lines of a Route of Fast Commerce Regarding a New Industrial Center—Great Lakes Aircraft Corporation

TO claim recognition as the "Air Capital of America" has become almost a universal habit among enterprising cities of today. Without wishing to become involved in any controversy, however, Great Lakes Aircraft Corporation is glad in its own behalf and in behalf of its customers to own Cleveland as its home.

Marked as we find ourselves at the hub around which revolve eighty percent of North America's commercial and sport activities. The great eastern seaboard and the rich Mississippi and Ohio Valleys are

only a few hours away. Boston, New York, Philadelphia, Chicago, St. Louis, Cincinnati, and Detroit are neighbors.

Production-wise, our sources of material and skilled labor lie within easy reach, lowering costs, increasing value. Coal, rubber, glass, steel, gas, aluminum—all the basic materials needed in the manufacture of aircraft are immediately at hand. Shipping facilities by air, rail and water are unexcelled. Distributors and individual purchasers find us easy of access—and prompt of service.



Military and Commercial Airplanes • Seaplanes and Floats • Aluminum Alloy Parts

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AMBASSADORS TO THE AIR

IN coming to the production of aircraft engines Continental Motors Corporation brings to the new field of aviation the very background which is so essential to its continued success.

Thriving and flourishing through the stern school of 28 years' experience it is today the largest exclusive manufacturer of gasoline motors in the world.

The Continental Red Seal series of engines for aircraft use are for more than expert fabrications of sound designs. They are ambassadors to the air—carrying to fresh fields the good name and enduring reputation which Continental has so richly won wherever gasoline power is employed.



CONTINENTAL MOTORS CORPORATION
AERONAUTICAL DIVISION
Office and Factory: Detroit, Mich., U. S. A.

Continental Engines

THANK YOU for mentioning AVIATION

Speed the work with CURTIS Air Equipment~

— in Airports and
Airplane Factories



Curtis Compressor unit is 14 in. x 20 in. D., with capacities for 10-120 cu. ft. per minute.



Curtis Air Blower, capacities from 1 to 100 cu. ft. per min.



Curtis I-Beam Crane and Trolley, 1,000 lbs. capacity, 10 to 12 ft. free suspension.



Curtis Portable Air Tank—provides up to 100 cu. ft. of air from the most remote air supply.



Write for new
Catalog C-75

COMPRESSED air is rapidly being recognized as the modern method and economic ally of the airplane industry, as it has long been of the automotive industry.

The many uses and advantages of air-powered equipment in the operation of airports and airplane factories are such as to merit the careful investigation of any executive concerned with these industries.

This brief summary indicates some of the most obvious time-saving, work-saving and cost-saving uses:

CURTIS COMPRESSORS—Provide air for spray painting, spraying dope on the wings, tire inflation, charging shock absorbers, spray cleaning of engines, spraying of grease solvent or paint removers, air drying of parts dipped in kerosene, gasoline or other cleaning solutions, blowing out dust, chips, etc., at work benches and drilling presses; air power for operating air hoists, roustes, pneumatic drills, sand blasters, pneumatic water systems, etc.

CURTIS AIR HOISTS—A power hoist at little more than the cost of an ordinary chain block and in connection with a Curtis I-Beam Trolley or Crane, they can serve a wide-area floor space. Used for lifting engines out of the fuselage, mounting engines, wings and other parts of the plane, and many other purposes where a combination of power, speed and accuracy is a factor of economy.

CURTIS AIR TANKS—Portable tanks for taking air out to a plane away from the usual source of supply. Stationary tanks for use with compressor unit in the shop, also separate tanks for motoring on service tracks.

The Curtis Pneumatic Machinery Co. was founded in 1854 and maintains an air 75th year. It has acquired a capacity to build business equipment on a complete basis by integrity, sound policy and financial strength to protect the complete development and successful working of every line of production and commercial competition.

CURTIS

Pneumatic Machinery Co. St. Louis

Write for catalog C-75 and for any specific information you desire in connection with the use of air equipment in airports and airplane factory work.

THANK YOU for selecting AVIATION

[This is one of a series of McGraw-Hill advertisements displayed systematically in advertising areas in an effort to make industrial advertising more profitable to buyers and sellers. It is printed in these pages as an indication to readers that McGraw-Hill publishes materials more advertising effectiveness as well as editorial quality.]

Behind the scenes of circulation building



ADVERTISERS need to know more about circulation than circulation statements give them. The method of building circulation is mighty important, as the following questions suggest:

How do publishers locate and rate subscribing prospects? How do they get them? Why do they get them?

At McGraw-Hill circulation headquarters in New York there is a large map shown on this page. On it and there are colored pegs which show what circulation we do not have—plants, utilities or service organizations whose buying power should be covered by a McGraw-Hill publication.

No one—publisher or manufacturer—can map his prospects in this way without continuous research.

Between 50 and 60 salaried McGraw-Hill circulation men participate in this research to locate, rate and get only the decision men of industry and business.

The McGraw-Hill circulation man is trained to help the reader subscribe to the publication that deals most intimately with his daily problems. There is only his card in appearance at important industrial plants throughout the country, whose price is "no back again" advised.

—The publishers

THANK YOU for selecting AVIATION

A NEW CALL for distributors of American Eagle Airplanes!



Since the production of the new Kinner Powered Biplane, American Eagle has established itself more firmly than ever as the most popular plane in the commercial class. The following figures show why:

Twelve and seven-tenths percent of all new production type biplanes now in use are American Eagles.

But the future holds even greater prospects. This wonderful success is soon to be followed by the announcement of a new four-place cabin monoplane—a plane which will be as outstanding an example of its type as the Kinner Powered Biplane.

Today American Eagle invites a limited number of men to share the inevitable rewards of its enterprise. Its nationwide sales organization, powerful as it is, must be re-inforced. North, south, east and west—valuable territories are waiting to be claimed by well-qualified distributors.

These men will receive the benefits of an exceptionally fair and generous sales franchise: A liberal scale of discounts—a salable product—and the co-operation of a well-known, soundly established concern. We sincerely believe this to be one of the best opportunities of its kind ever offered. Write to us today!

AMERICAN EAGLE AIRCRAFT CORP. KANSAS CITY-KANSAS

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General Electric supercharger

G-E supercharging superchargers are small, gear-driven, high-speed, centrifugal compressors, built as part of an airplane engine, and serving the following purposes:

1. Improvement in distribution.
2. Displacement of carburetors.
3. Moderate or appreciable increase of power at sea level.
4. Appreciable increase of power at medium altitudes.

G-E supercharging superchargers are standard equipment on leading aviation engines.

The General Electric Company also manufactures the exhaust-driven supercharger used in all high-altitude work by the United States Army.



734-01
SEE US AT THE NATIONAL BUREAU OF STANDARDS, 345 N. 9TH ST., WASHINGTON, D. C.
GENERAL ELECTRIC
General Electric Co., Schenectady, N. Y.; Sales Offices in Principal Cities

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THE old method of making an air-cooled cylinder by machining out the fins from the solid forging was good enough for the experimental days, but in this day of quantity production the old methods are too slow and too expensive.

NEW alloys, developed after long experience and research, combine the necessary strength with light weight and at the same time have remarkable wearing qualities. A carefully developed foundry technique, based on twenty-five years' experience in manufacturing air-cooled cylinders, insures satisfactory castings from the most difficult patterns.

IF YOU are using forged cylinders, it will pay you to investigate the advantages of Cheney-Cast Cylinders.

Wright Gypsy



The Wright Gypsy cylinder is now manufactured under production methods and other outstanding motor manufacturing methods are now being Cheney-Cast Cylinders to advantage.



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In the air above and on the waters beneath AQUATITE WATERPROOF PLYWOOD stands the test of durability.



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GRAND BUILDING, 122 East 42nd Street, NEW YORK
Telephone BR 6-1674

CURTISS COMMENT No. 4

★
THE FLY LEAF, our new magazine, is receiving a cordial reception.

BOW HIGH IS UP?—Al Brecken, flying a Bader, recently broke the world's altitude record for OX motors—16,500 feet.

FUTURE PROGRESS—Large expenditures in Curtiss and other good flying schools are an excellent guarantee of aviation's future.

CITY COMMENT—New Yorkers are beginning to refer to the new Curtiss Show Room as "Aviation Headquarters." Not a bad slogan, at that!

IRON BLOWING—Just to remind every one that each product sold by Curtiss Flying Service is repaired and maintained by a nationwide chain of service houses.

CURTISS FLYING SERVICE

37 WEST 57th STREET, NEW YORK CITY
"World's Greatest Flying Organization"



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Eclipse on the Air Map

Air transport interests as well as engine manufacturers and plane makers are on the list of those who use Eclipse equipment. Eclipse Starters are not only very widely used, but they are used on projects whose success is significant in the progress of aviation.

Everywhere, Eclipse equipment is proving worthy of such trust; proving its excellence of design and manufacture under a wide variety of critical conditions.

ECLIPSE MACHINE COMPANY, *East Orange Plant*
EAST ORANGE, N. J. ELMIRA, N. Y. WALKERVILLE, ONT.



Eclipse Series 6 Combination Hand and Electric Inertia Starter for radial engines up to 1350 cubic inches; Series 11 Combination Hand and Electric Inertia Starter for radial engines up to 2500 cubic inches, Concentric type with magnetic switch.



Eclipse Series 6 Hand Inertia Starter, Concentric type, particularly adapted for radial engines up to 1350 cubic inches. Series 11 Hand Inertia Starter for radial engines up to 2500 cubic inches.

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AVIATION STARTERS AND GENERATORS